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(54) Title: A COMPOSITION AND A PRODUCT CONTAINING THE SAME

(57) Abstract

The invention relates to a paste–like composition which is applicable for use as such and as a filling, coating or other component of various food products, and which contains a significant amount of probiotic. The food product is preferably a bakery product, in particular a rye–containing bread, rusk, biscuit or the like.

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A COMPOSITION AND A PRODUCT CONTAINING THE SAME

FIELD OF THE INVENTION

The invention relates to a paste-like composition which is applicable for use as such and as a filling, coating or other component of various products intended for human or animal consumption, and which contains probiotic. The food product is preferably a bakery product, particularly a rye-containing bread, rusk, biscuit or the like.

BACKGROUND OF THE INVENTION

A probiotic is a component containing live microorganisms that is added to an edible product, the component having a beneficial effect on the microbial balance in the host's intestines and hence on the host's well-being and health in general. For instance, several lactic acid bacteria are found to have this kind of health improving probiotic effect on both human beings and animals, which effect is based on the ability of the microbe to enhance the welfare of the intestinal flora by equilibrating the microbial population, whereby the quantities of harmful, e.g. carcinogenic compounds, and pathogenic microbes decrease. Lactic acid bacteria are also found to reduce allergic symptoms and to alleviate lactose intolerance. Among the health effects of probiotics, a cholesterol lowering effect, a preventing and curing effect on diarrhea, a stimulating effect on immune response and even a reduction in cancer risk can also be mentioned. The probiotic effect may result both from a prebiotic compound produced by a microbe and from the ability of an intestinal microbe to equilibrate the growth of other microbes.

According to the definition, a prebiotic is a non-digestible ingredient of nourishment, which selectively stimulates the growth and/or activity of one or some beneficial intestinal bacteria, and which hence has a beneficial effect on the host's health. According to current knowledge, certain oligo- and polysaccharides, and possibly peptides, which are not hydrolyzed nor absorbed in the gastro-intestinal tract, may act as prebiotics. One important group of prebiotics is fructo-oligosaccharides, other compounds having prebiotic effect include e.g. transglycosylated disaccharides, lactulose, palatinose-oligosaccharides and soybean oligosaccharides.

Traditionally man has consumed probiotics, even unknowingly, in the form of fermented milk products, such as sour milk and yoghurt. These products are an important and palatable part of the diet of numerous people;

whereas others avoid using fermented milk products both because of their acidity and because of the lactose they contain. So attempts have been made, for instance, to exploit the beneficial properties of yoghurt by modifying it and making other types of products therefrom. The literature of the art discloses several products of this kind.

For instance, US Patent 4,968,512, Kharrazi, discloses a yoghurt spread whose consistency, taste and structure resemble unripened cheese, but whose fat, cholesterol and calorie content is lower as compared with the unripened cheese. The spread is made from milk, from which the major part of the fat and about 75% of the moisture are first removed, whereafter it is heated and yoghurt starter is added thereto in a conventional manner.

European Patent Application 741 975, Fuji Oil Company, Ltd., discloses a sweet yoghurt product which is applicable for use in sweets and bakery products and which is prepared by fermenting a mixture, which contains protein, carbohydrate, fat, water and emulsifier, with a lactic acid bacterium and by adding a stabilizing agent to the mixture. A yoghurt product with a soft, paste-like consistency and a good taste is thus obtained according to the publication. A similar sweet product, which is applicable for a filling for e.g. Danish pastries and biscuits is described in European Patent Application 256 561, Ferrero. This product is made from pre-fermented curd cheese or yoghurt, to which are added milk, sugar, fat, and possibly aroma and flavor compounds, and carob powder as an emulsifier. European Patent Application 666 031, Barilla, discloses a similar paste, which is applicable for use as a filling of sweet confectionery products. This product is also based on yoghurt, other ingredients comprise anhydrous fat, saccharose, fat-free milk and live lyophilized lactic acid bacteria. According to the publication, the product contains the number of bacteria equivalent to yoghurt, about $8x10^5$ and it combines the nutritional properties of yoghurt and the organoleptic properties of a sweet confectionery product.

These prior art products are yoghurt-based products whose lactic acid bacteria contents, at their best, correspond to those normally appearing in yoghurt. The literature of the art has amply reported on researches whose aim was to prove yoghurt's beneficial effects on health, i.e. probiotic effects. However, the results have been rather controversial, and no clear proof of such an effect has been found. In the present invention, it is believed that this is mainly due to the fact that the lactic acid bacteria content of yoghurt or a product

made therefrom is not sufficient to provide the desired probiotic effect. The second main reason is that the probiotic is not preserved in the product during storage, but the content continuously declines. The third contributing factor is that the quantities contained in the product, which quantities also otherwise are insufficient, do not pass unchanged through the gastro-intestinal tract and do not remain in the colon. Also, it is to be noted that the prior art products are in general sweet products whose sugar, fat and energy content is high and which are used as a filling in sweet and fatty bakery products or sweets. Thus they are poorly applicable for everyday use.

For probiotic use, lactic acid bacteria are also available as lyophilized preparations, which contain a pure culture or mixed culture of bacteria as their main ingredient and a protective agent necessary for lyophilization, a so-called cryoprotectant. In Finland these preparations are sold as pharmaceuticals and according to instructions the preparation is suspended in water or other suitable liquid before use.

A probiotic composition containing lyophilized micro-organisms is also described in WO 96/08261, the University of New South Wales. In addition to one or more probiotics, the composition contains about 2 to 20% by weight carrier which is modified or unmodified starch. Preferably, the product is in the lyophilized form, when the starch acts as a cryoprotectant during lyophilization. The composition may also be a granular or microencapsulated preparation, whereby it preferably also contains fat. The composition can be consumed as such or added to a variety of foods and drinks, such as yoghurt, ice cream and other dairy products, bakery products, edible oils and so on. The publication mentions as probiotics *Saccharomyces, Bifidobacterium, Bacteroides, Clostridium, Fusobacterium, Propionibacterium, Streptococcus, Enterococcus, Lactococcus, Staphylococcus, Peptostreptococcus* and *Lactobacillus.* All the listed microorganisms are not commonly recognized in the field as probiotics, for instance, clostridia and staphylococci are more regarded as harmful organisms.

In practice, this kind of lyophilized or concentrated bacterial preparations suspend poorly in other products, and their consumption is not very pleasant. Moreover, they are in general perceived as medicine-like substances, and because of that, the consumer does not find it sensible to use them.

DESCRIPTION OF THE INVENTION

The object of this invention is to provide for the use of consumers a new type of a probiotic-containing edible product, in which the quantity of probiotic is sufficient to provide the desired probiotic effect, in which the number of bacteria and other properties remain unchanged for several months at room temperature, and which is both palatable and wholesome for the consumer.

The objects of the invention were achieved by forming a paste-like composition, the probiotic content of which is about $1x10^7$ to $5x10^{11}$ cfu/g. As a second functional main ingredient the composition contains anhydrous fat or fat substitute. Additionally, the composition may also contain a prebiotic or it can be consumed with a prebiotic.

Thus the invention relates to a paste-like composition which contains anhydrous fat or fat substitute and probiotic as the functional main ingredients, the probiotic content being about $1x10^7$ to $5x10^{11}$ cfu/g.

One of the functional main ingredients of the composition in accordance with the invention is thus anhydrous fat and/or fat substitute. The fat may be any edible, anhydrous fat, such as anhydrous vegetable or animal fat or a mixture thereof. The vegetable fat may originate from e.g. coconut, peanut, soybean, rape seed, etc., and it may be partly or completely hardened. Tallow and lard can be mentioned as examples of applicable anhydrous animal fats. So-called low-cal fats, such as Benefat® and Olestra® are preferably used as a substitute for fat, whereby the calorie content of the composition can be reduced and thus the properties of the product can be further improved. A mixture of the fat and/or its substitute and a (light) bulking agent can also be used as the fat, whereby the energy content of the composition is reduced, but the properties of fat-soluble aromatic and flavouring agents come out well. Suitable non-fat (light) bulking agents are e.g. dextrines, polydextrose, such as Litesse®, and fibre products, such as Oatrim®. The amount of fat or a fat preparation varies in the composition depending, for instance, on the nature of the fat so that, when using ordinary fat, the amount is smaller than when using a mixture of fat and substitute. Thus the amount of fat preparation in the composition may be about 30 to 85%, preferably about 40 to 70% or about 50 to 60%. (Light) bulking agent can be used up to 30%, even in that case, the amount may vary depending on the nature of the (light) bulking agent used. Suitable amounts of maltodextrose are, for instance, 10 to 25%,

preferably about 15%, and polydextrose is used up to 30%, preferably about 20%.

The water activity, i.e. the Aw value, of the composition of the invention is low due to the second main ingredient, i.e. the anhydrous fat or fat substitute. Low water activity has the advantage that the growth of microorganisms, in particular harmful moulds, is inhibited in the product. The growth of the probiotic is also inhibited, but it stays viable in the product and thus the probiotics content remains unchanged. Another advantage of low water activity is that the composition remains paste-like, and moisture will not migrate therefrom to the food product, such as bread, in connection with use, which would deteriorate the structural and taste properties of the food product and enhance staling caused by microbes. The Aw value of the composition is preferably less than about 0.70, more preferably less than about 0.50.

The other functional main ingredient of the composition of the invention is a probiotic. High probiotic content is an important characteristic of the composition. A sufficient amount of probiotic is included in the composition in order that the desired probiotic effect is achieved. So the amount of probiotic in the composition may also vary within a wide range, for instance, depending on the strain used and the total daily intake. Generally, the content in the composition is about $1x10^7$ to $5x10^{11}$ cfu/g, preferably $1x10^8$ to $1x10^{11}$ cfu/g and more preferably about $1x10^9$ to $1x10^{10}$ cfu/g.

The probiotic may be any microorganism having a probiotic effect, such as e.g. a lactic acid bacterium, a bifidobacterium or a streptococcus. Organisms which belong to genera *Streptococcus, Lactobacillus* and *Bifidobacterium* are considered advantageous. *Lactobacillus GG, Lactobacillus casei, Lactobacillus acidophilus, Lactobacillus plantarum, Lactobacillus helveticus, Lactobacillus bulgaricus, Lactobacillus reuterii, Streptococcus rhamnosus, Streptococcus thermophilus, Bifidobacterium bifidum* and *Bifidobacterium infantis* can be mentioned as examples of suitable organisms. The composition may contain the probiotic both as a pure culture, which consists of only one strain, and as a mixed culture, whereby it contains several different strains. The probiotics may be either in the form of a suspension, when, however, the suspension is dried to a sufficiently low water activity before being added to the composition, or in the dried form. Probiotic preparations lyophilized in known manners are preferably used.

The composition of the invention is preferably used with a prebiotic.

The composition itself may then contain the prebiotic, the composition can be used as a spread, coating, filling or other component of a prebiotic-containing edible product, or the composition and the prebiotic can be consumed separately. Within the scope of the present invention, a synbiotic, i.e. the combination of a probiotic and a prebiotic, that is, the two first mentioned alternatives are considered advantageous. The prebiotic may be e.g. an oligosaccharide, in particular fructo-oligosaccharide, such as oligofructose or inulin, galacto-oligosaccharide, palatinoseoligosaccharide, chicory or soybean oligosaccharide, raffinose, stachyose, gentio-oligosaccharide, non-degradable starch, lactulose, lactosaccharose, xylo- or isomalto-oligosaccharide. Fructan, the fructo-oligosaccharide naturally present e.g. in rye, lactulose and soybean oligosaccharides are considered advantageous prebiotics. The prebiotic may be incorporated into the composition, when the final product i.e. the product per se filled or coated with the composition does not contain prebiotic, and optionally when there is a desire to raise the prebiotic content to a specific, sufficient level for achieving the prebiotic effect. What is a sufficient level is determined, for instance, on the basis of the probiotic, other ingredients and application of the composition, and thus it varies widely. For instance, the recommended value for bifidogenic oligosaccharides is less than 15 g per day. Hence a suitable prebiotic content of the composition is at most about 25%. After the publication of the present invention, determining the suitable amount is known to the person skilled in the art.

In addition to the prebiotic effect, the prebiotics also have other favourable effects on the taste and quality of the composition. The prebiotics enhance the flavour and aroma of the composition, they are non-cariogenic, their energy content is low, and like dietary fibres, they are not digested in the intestines. Thus the prebiotics are well suited for diabetics and also for the cure and prevention of constipation. One of the most considerable properties in this connection is the ability of prebiotics to lower water activity; the prebiotic may thus contribute to obtain the desired low Aw value. It is to be noted that e.g. certain fructo-oligosaccharides, for other properties as well, are well suited for fat substitutes or (light) bulking agents.

The composition may also contain other ingredients, such as aroma and flavor compounds, cheese powder, milk powder, yeast extract, salt and other conventional seasonings, builders, bulking agents, and so on. These ingredients are added in suitable amounts to obtain the desired taste and struc-

ture, depending on the composition and final product concerned.

Typical amounts of components of the composition in accordance with the invention may be, for instance, the following:

- Probiotics, about $1x10^7$ to $5x10^{11}$ cfu/g
- Fat, e.g. coconut fat, about 30 to 40% or fat substitute, e.g. Benefat®, about 50 to 60%
- Cheese powder, about 35 to 45%, or
  milk powder, about 10 to 20%, and
  cheese powder, about 10 to 20%
- Maltodextrose, about 13 to 17%
- Aroma compounds, about 1 to 5%
- Yeast extract, less than about 2%
- Fat (light) bulking agent, such as Litesse®, about 13 to 23%

The energy content of the composition of the invention is preferably low, which requires the use of a fat substitute with low calorie content, i.e. a so-called low-cal fat or a non-fat (light) bulking agent. Also, the cheese used is preferably a low-calorie alternative, e.g. Low Fat Mature Cheddar (Golden Vale). In the preferable form, the composition is not sweet, i.e. its sweetener content is low, and the product is a salted snack in nature rather than a sweet bakery product. Despite that, the basic idea of the invention, i.e. the forming of a composition whose functional ingredients comprise anhydrous fat or fat substitute, a large amount of probiotic, possibly prebiotic, and whose water activity is low and which is consumed as a paste-like product as such or as a filling, coating or other component of another product, can naturally be applied for forming sweet products as well.

The composition is readily prepared. The dry ingredients are mixed together, the fat is creamed by beating and then added by carefully mixing to the dry ingredients.

The composition of the invention can be consumed as such. However, it is preferably used as a coating or filling of edible products. The edible product is preferably a bakery product, particularly a salted bakery product, which in a preferred embodiment is a rye-containing, soft or dry, sour bakery product. A thin rye crispbread, with the probiotic-containing composition of the invention as filling, is described as the most preferable product. Rye contains fructan (D. Petterson and P. Åman, Acta Agric. Scand. 37 (1987), 20-26), which is a fructo-oligosaccharide known as a prebiotic and which has a stimu-

lating effect on the growth of particularly lactic acid bacteria and bifidobacteria. On the other hand, when wheat, oats, barley or other cereal or the like is used, prebiotic can be added to the product, naturally this is also possible when rye is used and there is a desire to raise the prebiotic content of the product.

The composition in accordance with the invention can be packed as such and used in households or in baking industry as a spread, coating or filling for both soft and dry bakery products, such as plain breads, rolls, salted and sweet biscuits, cookies, rusks and snacks. Various forms of packing are obvious to the person skilled in the art, e.g. table containers, one-serving tubs, tubes and other plastic, glass and carton containers can be mentioned as examples.

In accordance with the invention, the composition is preferably used as a filling in ready-to-eat snack-type bars, thin crispbreads, and so on.

In accordance with the present invention, a preferable final product is a filled thin crispbread, which is prepared of rye flour or a mixture of rye flour and other flours, thus containing the prebiotic of rye, the fructan, and which as a filling contains the paste-like composition of the invention, having a probiotic and an anhydrous fat as main ingredients. More preferably, the final product utilizes a rye crispbread, such as FINN CRISP®, onto which is arranged a filling, which mainly consists of low-cal fat and non-fat (light) bulking agent, probiotic, which is *Lactobacillus, Streptococcus* or *Bifidobacterium*, and cheese powder. Most preferably, the probiotic is a strain of *Lactobacillus acidophilus, Lactobacillus reuterii, Lactobacillus bulgaricus, Streptococcus thermophilus* or *Bifidobacterium bifidus* or a mixed culture of these strains. The amount of probiotic is about $1x10^7$ to $5x10^{11}$ cfu/g, which amount is sufficient to provide the probiotic effect. For instance, when the filling contains probiotic about 10^9 cfu/g, by consuming five thin crispbreads a day, the intake of probiotic is $0.5x10^{11}$ cfu per day, which amount is sufficient to prevent traveller's diarrhea, for instance.

The composition is preserved as such at room temperature or in the cool. Preservation tests conducted in connection with the invention indicate that in practice, after six-month storage at room temperature, the composition had not changed at all as regards the structure and the bacterial content.

The invention will be described in greater detail by means of the following examples. These examples only illustrate the invention and they are not to be considered to restrict its scope in any way.

Example 1

The composition of the invention was prepared of the following ingredients:

	% (weight/weight)
Cheese powder	40.00
Coconut fat	35.00
Maltodextrine	13.00
Cheese aromatic	1.00
Probiotic	11.00

The probiotic was *Streptococcus thermophilus*, TH3, Chr. Hansen's.

For preparing the composition, the fat was creamed with a blender, the dry ingredients were mixed together and added to the fat by carefully mixing,

The water activity of the composition was measured with a Novasina meter. The value varies within the range of 0.2 to 0.4 depending on the quality of components.

Example 2

The composition of the invention was prepared of the following ingredients:

	% (weight /weight)
Fat, Benefat® (Cultor Oy)	53.00
Fat-free milk powder	13.00
Yeast extract	1.5
Salt	0.50
Cheese powder, Emmenthal	17.00
Aromatic preparation, Emmenthal	2.5
Pepper extract	2.5
Probiotic	10.00

The probiotic was *Lactobacillus acidophilus LA 5*, Chr. Hansen's. The composition was prepared in the manner described in Example 1.

The water activity of the composition was less than 0.5.

Example 3

A light composition of the invention was prepared of the following

ingredients:

	% (weight/weight)
Benefat® (Cultor Oy)	52.00
Litesse® (Cultor Oy)	18.00
Yeast extract	1.5
Low-fat cheese powder, Low Fat Mature Cheddar (Golden Vale)	15.00
Cheese aromatic, Emmenthal	2.5
Pepper extract	1.0
Probiotic	10.00

The probiotic was *Bifidobacterium Bb 12*, Chr. Hansen's. The composition was prepared in the manner described in Example 1. The water activity was 0.3.

Example 4

The composition prepared according to Example 1, 2 or 3 was used as a filling for a thin crispbread which was made of the following ingredients:

	% (weight/weight)
Wholemeal rye flour	96.00
Salt	0.23
Yeast	0.77
Water	3.00

The thin crispbread was baked in the manner known per se and the filling was added in the manner described in the Finnish Patent Application 971119.

The composition and energy content of the filled products are shown in Tables 1/1 to 1/3.

Table 1/1

The composition and energy content of the filling according to example 1 and of the final product containing the same

	Final product containing filling 100 g	Filling 100 g	Bread 100g
Energy, kJ	1827	2300	1350
Energy, kcal	435	550	320
Protein, g	14.3	18	11
Fat, g	26	52	2.2
Saturated fatty acids, g	23	46	0.3
Carbohydrate, g	39	13	64
Sodium, g	0.8	1	0.67

Table 1/2

The composition and energy content of the filling according to example 2 and of the final product containing the same

	Filled crispbread 100 g	Filling 100 g	Bread 100g
Energy, kJ	1574	1794	1350
Energy, kcal	371	423	320
Protein, g	12.5	14	11
Fat, g	31	60	2.2
Saturated fatty acids, g	29	58	0.3
Carbohydrate, g	36	9	64
Sodium, g	0.8	1	0.67

Table 1/3

The composition and energy content of the filling according to example 3 and of the filling containing the same

	Filled crispbread 100 g	Filling 100 g	Bread 100g
Energy, kJ	1323	1470	1350
Energy, kcal	335	359	320
Protein, g	11	12	11
Fat, g	27	52	2.2
Carbohydrate, g	41	18	64
Sodium, g	0.8	1	0.67

Example 4

The viability of a commercially available lyophilized strain of *Lactobacillus rhamnosus* in a thin crispbread filling was studied in this example. The thin crispbread filling prepared according to Example 2 was used as the filling. In the experiment, changes in the number of bacteria in four different samples were studied, when the samples were preserved at room temperature and in a cold store (4 °C).

The results of Table 2 show that the studied bacterial strain is in practice preserved unchanged for at least six months. Since the number of bacteria is not in practice markedly decreased in the course of the period studied, it can be assumed that the strain remains stable also for longer periods of time.

Table 2. Number of lactic acid bacteria cfu/g of composition

Storing time											
	0 days	6 days		21 days		53 days		4 months		6 months	
Sample		4 °C	21°C	4°C	21°C	4°C	21°C	4°C	21°C	4°C	21°C
1	1×10^6	3×10^6	9×10^6	3×10^6	1×10^6	1×10^6	1×10^6	$0{,}4 \times 10^6$	$0{,}3 \times 10^6$	5×10^6	$0{,}3 \times 10^6$
2	2×10^7	$0{,}9 \times 10^7$	4×10^7	2×10^7	9×10^7	3×10^7	1×10^7	3×10^7	$0{,}5 \times 10^7$	6×10^7	1×10^7
3	1×10^8	2×10^8	1×10^8	3×10^8	2×10^8	4×10^8	1×10^8	2×10^8	$0{,}6 \times 10^8$	8×10^8	3×10^8
4	3×10^9	3×10^9	9×10^9	4×10^9	2×10^9	4×10^9	2×10^9	2×10^9	2×10^9	2×10^9	1×10^9

CLAIMS

1. A paste-like composition, **characterized** by containing anhydrous fat or fat substitute and probiotic as functional main ingredients, the amount of probiotic being $1x10^7$ to $5x10^{11}$ cfu/g.

2. A composition as claimed in claim 1, **characterized** in that its water activity (Aw) is less than 0.70.

3. A composition as claimed in any one of claims 1 to 8, **characterized** in that its Aw is preferably about 0.30 to 0.50.

4. A composition as claimed in any one of claims 1 to 3, **characterized** in that the fat is preferably a fat substitute, such as a low-cal fat.

5. A composition as claimed in any one of claims 1 to 4, **characterized** in that part of the fat is replaced with a (light) bulking agent.

6. A composition as claimed in any one of claims 1 to 5, **characterized** by containing fat preparation about 30 to 85%, preferably about 40 to 70%.

7. A composition as claimed in any one of claims 1 to 6, **characterized** in that the probiotic is a lactic acid bacterium or a bifidobacterium.

8. A composition as claimed in claim 7, **characterized** in that the probiotic belongs to the genus *Streptococcus, Lactobacillus* or *Bifidobacterium.*

9. A composition as claimed in claim 8, **characterized** in that the probiotic is preferably *Lactobacillus GG, Lactobacillus casei, Lactobacillus acidophilus, Lactobacillus plantarum, Lactobacillus helveticus, Lactobacillus bulgaricus, Streptococcus rhamnosus, Streptococcus thermophilus, Bifidobacterium bifidum* and/or *Bifidobacterium infantis.*

10. A composition as claimed in any one of claims 1 to 9, **characterized** by containing probiotic about $1x10^7$ to $5x10^{11}$, preferably about $1x10^8$ to $1x10^{11}$, more preferably about $1x10^9$ to $1x10^{10}$ cfu/g.

11. A composition as claimed in any one of claims 1 to 10, **characterized** by being used with a prebiotic.

12. A composition as claimed in claim 11, **characterized** by containing prebiotic.

13. A composition as claimed in claim 11 or 12, **characterized** by being incorporated in a food product containing prebiotic.

14. A composition as claimed in any one of claims 1 to 13, **characterized** by containing fructo-oligosaccharide, galacto-oligosaccharide, palatinoseoligosaccharide, chicory or soybean oligosaccharide, raffinose, stachyose, lactulose, lactosaccharose, gentio-, xylo- or isomalto-oligosaccharide as the prebiotic.

15. A composition as claimed in claim 14, **characterized** by containing fructo-oligosaccharide, in particular fructan of rye.

16. A composition as claimed in any one of claims 1 to 15, **characterized** by additionally containing aroma and flavor compounds, salt, other seasonings and/or builder or bulking agent.

17. Use of a composition as claimed in any one of claims 1 to 16 as a spread, a filling or a coating for a food product.

18. Use as claimed in claim 17, **characterized** in that the food product is a bakery product, such as a sweet or salted bread, rusk, biscuit, cookie or snack.

19. A food product, **characterized** by comprising a filling, spread or coating, which consists of a composition as claimed in any one of claims 1 to 18.

20. A food product as claimed in claim 19, **characterized** by being a bakery product.

21. A food product as claimed in claim 20, **characterized** by being a rye-containing bread or rusk, preferably a thin crispbread of rye, filled with the composition.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 98/00646

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A23D 9/007, A21D 13/00, A23L 1/30
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: A23D, A21D, A23C, A23L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, EPODOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0704164 A2 (FUJI OIL CO., LTD.), 3 April 1996 (03.04.96) --	1-21
X	EP 0666031 A2 (BARILLA G. E R.F.LLI), 9 August 1995 (09.08.95), page 3, line 9; page 3, line 46 - line 55; page 4, line 57 - page 5, line 7 --	1-21

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" erlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
3 December 1998	04 -12- 1998
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Jack Hedlund Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

Information on patent family members

03/11/98

International application No.
PCT/FI 98/00646

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		IT MI940186 D,U,V	15/09/95
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